SUBSTITUTE SPECIFICATION
(marked-up version)

BACKGROUND OF THE INVENTION

[Technical Field of the Invention]

Field of the Invention.

The present invention relates to a method [for] of determining the digging position of a digging head in a [non-open-cut method of] substantially horizontal digging or excavation and, more particularly, to a method [which] that ensures accuracy in determining positions of the digging head by lessening the influence of [a] noise magnetic field [of] frequency components close to [that of] the signal magnetic field to be measured.

Sub spec OK for entry

[Prior Art]

Brief Description of the Prior Art.

A horizontal drilling method, which is one of the [non-open-cut] boring or trenching methods of this kind, uses a small-diameter pipe of 100 mm or less [across] for horizontally digging in the ground, and , accordingly, [such a] the kind of precision position - determining apparatus [as] used in an ordinary small-diameter driving method of excavation cannot be placed near a drill. To solve this problem, it is customary in the art to generate [adopt a method in which] an AC magnetic field [is generated] by means of a coil mounted in the drill head that is [and] detected by an above-ground magnetic sensor like a coil to determine the current digging position.

This method is simple and easy, but since the magnetic field by the coil is a [dipole] dipolar magnetic field, [it] the field rapidly attenuates with distance from the coil. [Hence, this] The method is defected in that it is unable to [has a defect of inability to] achieve a highly reliable [high-reliability] determination of the digging position when a power line or similar magnetic noise source is present in [the vicinity of] or around the place where [to perform] the position determination is performed.

[SUMMAR] SUMMARY OF THE INVENTION

An object of the present invention is to provide a position - determination